



## Year 9 Worksheet 7: Properties of Geometrical Figures

Question 1: Answer the following.

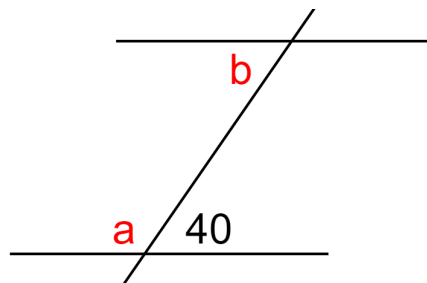
(1) What is the third angle in a triangle if two angles are complementary?

- A. Acute    B. Right    C. Obtuse    D. Reflex    E. Supplementary

(2) What is the value of angle that is supplementary to  $25^\circ$ ?

- A.  $65^\circ$     B.  $75^\circ$     C.  $155^\circ$     D.  $165^\circ$     E.  $335^\circ$

(3) Find the value of angle **a** in the figure below.



- A.  $40^\circ$     B.  $50^\circ$     C.  $60^\circ$     D.  $140^\circ$     E.  $180^\circ$

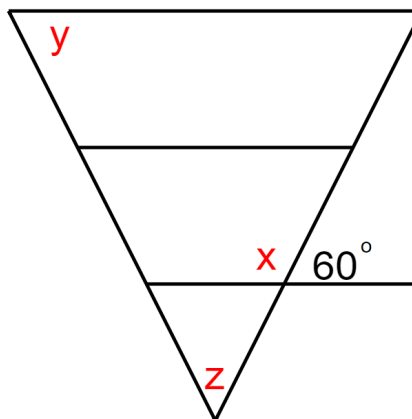
(4) Find the value of angle **b** in the figure below.

- A.  $40^\circ$     B.  $50^\circ$     C.  $60^\circ$     D.  $140^\circ$     E.  $180^\circ$

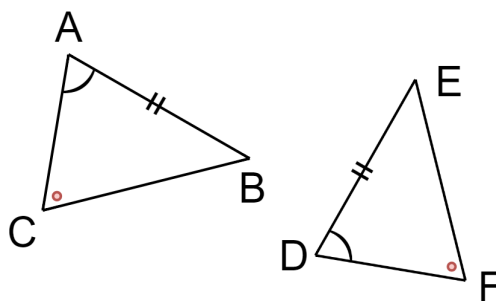


(5) The values of  $x$ ,  $y$ , and  $z$  are:

- A.  $x = 30^\circ$ ,  $y = 60^\circ$ ,  $z = 120^\circ$
- B.  $x = 150^\circ$ ,  $y = 30^\circ$ ,  $z = 30^\circ$
- C.  $x = 120^\circ$ ,  $y = 30^\circ$ ,  $z = 60^\circ$
- D.  $x = 30^\circ$ ,  $y = 60^\circ$ ,  $z = 30^\circ$
- E.  $x = 120^\circ$ ,  $y = 60^\circ$ ,  $z = 60^\circ$



(6) What is the abbreviated reason for congruence in  $ABC$  and  $DEF$ ?



- A. AA
- B. SAS
- C. SSS
- D. RHS
- E. AAS

(7) The sum of the interior angles in a heptagon is:

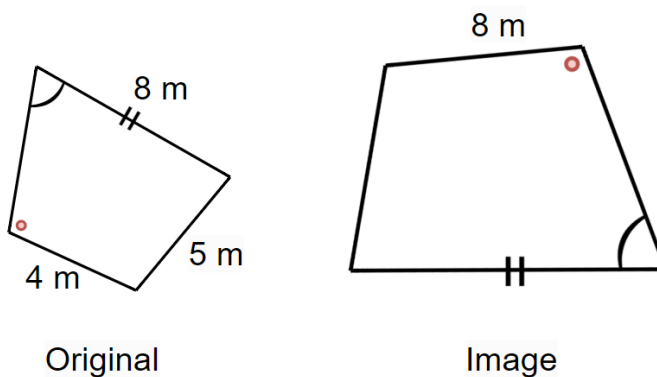
- A.  $360^\circ$
- B.  $540^\circ$
- C.  $720^\circ$
- D.  $900^\circ$
- E.  $1078^\circ$

(8) Which type of quadrilateral has all sides equal, two pairs of opposite parallel sides, no right angles, and a perpendicular diagonal?

- A. Trapezium
- B. Rhombus
- C. Kite
- D. Parallelogram



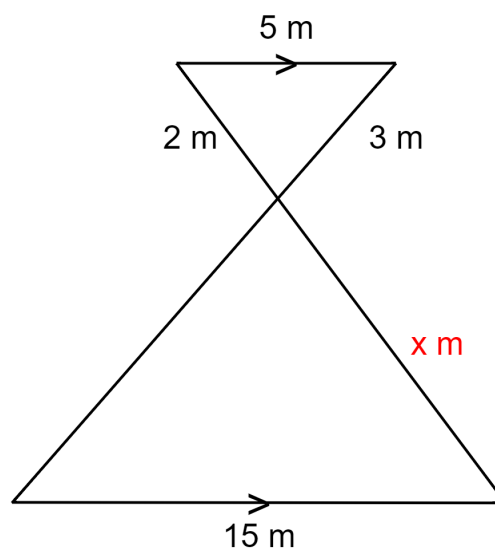
(9) What is the scale factor that enlarges the original figure to the image?



- A. 1      B. 2      C. 1.5      D. 3      E.  $\frac{2}{3}$

(10) Find the value of  $x$  in m.

- A.  $x = 6$   
B.  $x = 9$   
C.  $x = 10$   
D.  $x = 15$   
E.  $x = 23$



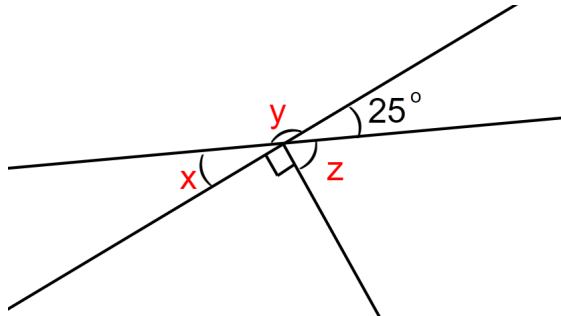


Question 2: Answer the following.

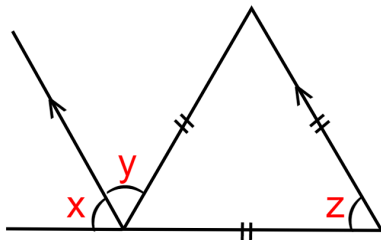
1

Find the missing angle in the diagrams. Give reasons for your answers.

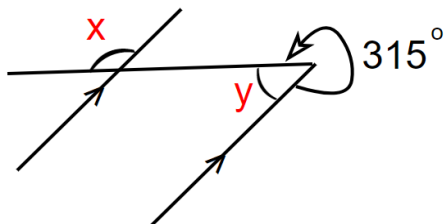
a.



b.



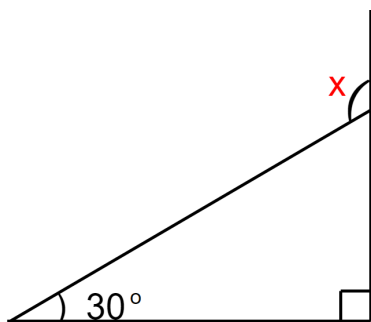
c.



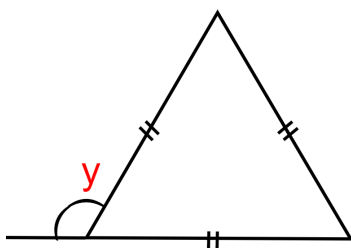


2 Name the following triangles and find the value of the pronumeral.

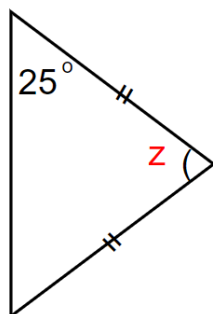
a.



b.



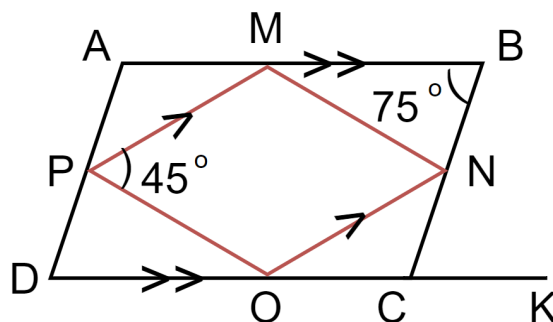
c.





3

Answer the following:



a. Find  $\angle BCD$

b. Find  $\angle ADO$

c. Find  $\angle PMN$

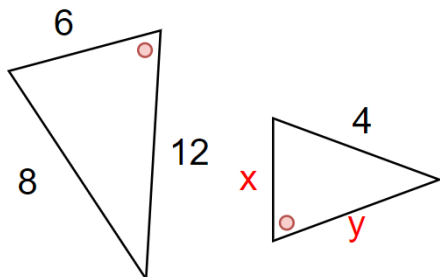
d. Find  $\angle NCK$



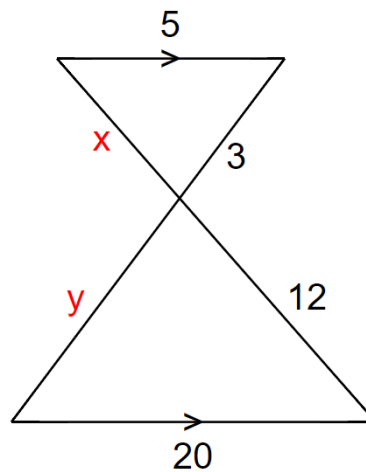
4

Find the value of  $x$  and  $y$  in the following:

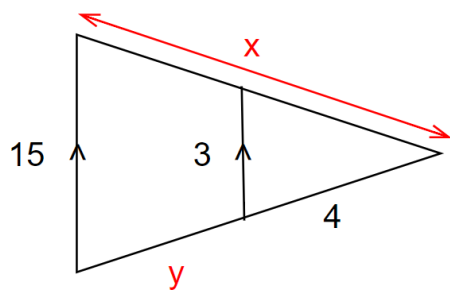
a.



b.



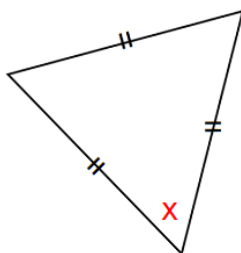
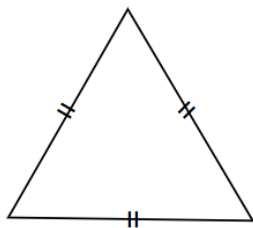
c.



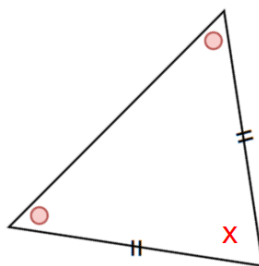
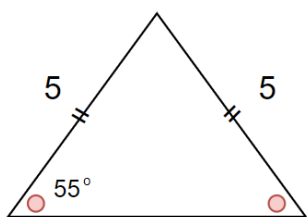


5 State the conditions of congruence of triangles, find the x value.

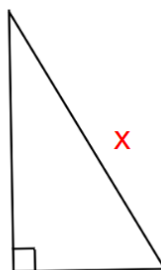
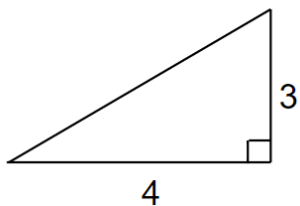
a.



b.



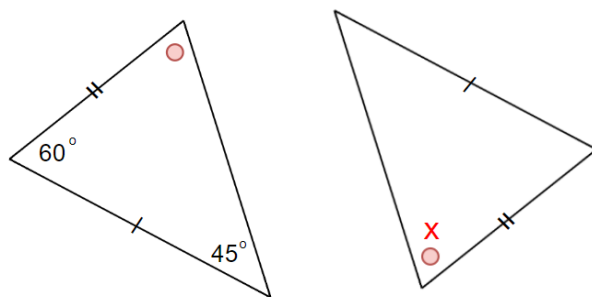
c.





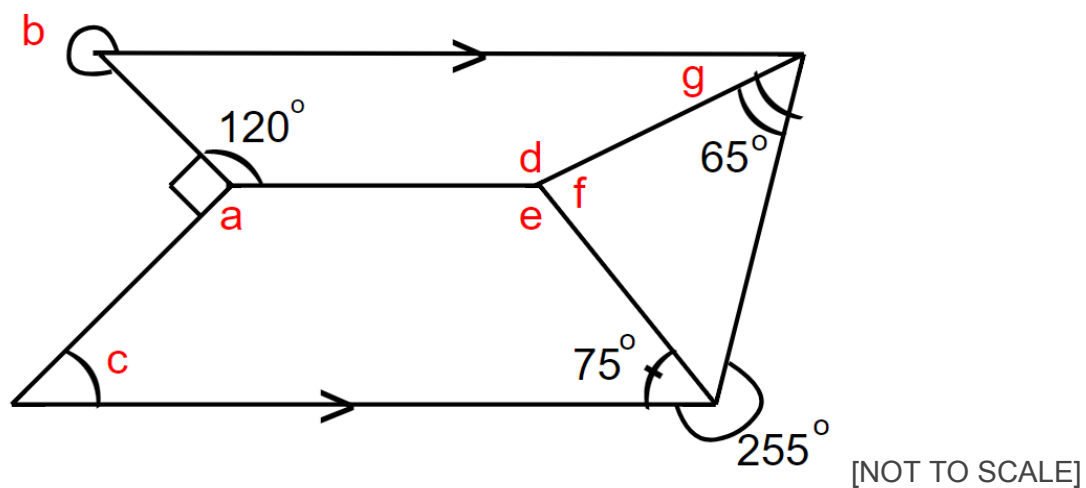


d.



6

Find the value of each pronumeral in the following shape.





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# Answer Key

Question 1: Answer the following.

(1) What is the third angle in a triangle if two angles are complementary?

- A. Acute    B. Right    C. Obtuse    D. Reflex    E. Supplementary

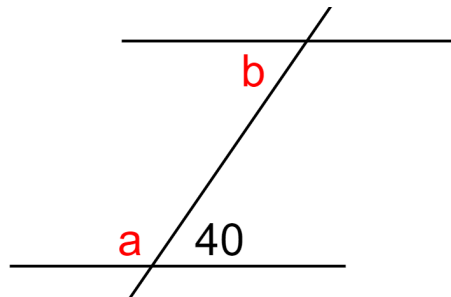
**Answer: B. Right**

(2) What is the value of angle that is supplementary to  $25^\circ$ ?

- A.  $65^\circ$     B.  $75^\circ$     C.  $155^\circ$     D.  $165^\circ$     E.  $335^\circ$

**Answer: C.  $155^\circ$**

(3) Find the value of angle **a** in the figure below.



- A.  $40^\circ$     B.  $50^\circ$     C.  $60^\circ$     D.  $140^\circ$     E.  $180^\circ$

**Answer: D.  $140^\circ$**

(4) Find the value of angle **b** in the figure below.

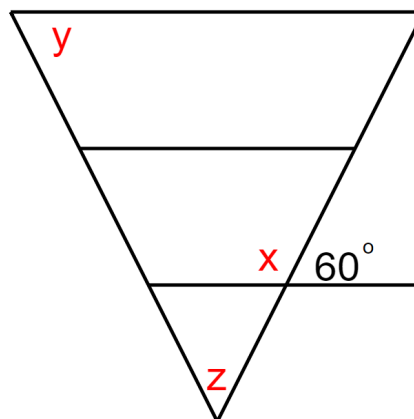
- A.  $40^\circ$     B.  $50^\circ$     C.  $60^\circ$     D.  $140^\circ$     E.  $180^\circ$

**Answer: A.  $40^\circ$**



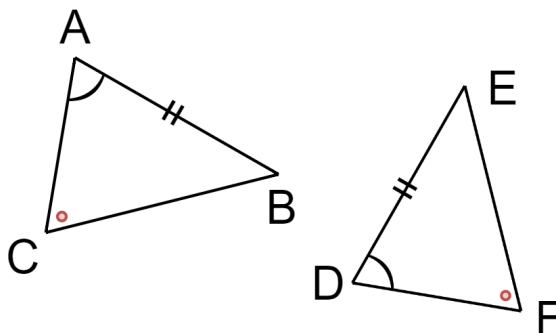
(5) The values of  $x$ ,  $y$ , and  $z$  are:

- A.  $x = 30^\circ$ ,  $y = 60^\circ$ ,  $z = 120^\circ$
- B.  $x = 150^\circ$ ,  $y = 30^\circ$ ,  $z = 30^\circ$
- C.  $x = 120^\circ$ ,  $y = 30^\circ$ ,  $z = 60^\circ$
- D.  $x = 30^\circ$ ,  $y = 60^\circ$ ,  $z = 30^\circ$
- E.  $x = 120^\circ$ ,  $y = 60^\circ$ ,  $z = 60^\circ$



**Answer: E.  $x = 120^\circ$ ,  $y = 60^\circ$ ,  $z = 60^\circ$**

(6) What is the abbreviated reason for congruence in ABC and DEF?



- A. AA
- B. SAS
- C. SSS
- D. RHS
- E. AAS

**Answer: E. AAS**

(7) The sum of the interior angles in a heptagon is:

- A.  $360^\circ$
- B.  $540^\circ$
- C.  $720^\circ$
- D.  $900^\circ$
- E.  $1078^\circ$

**Answer: D.  $900^\circ$**

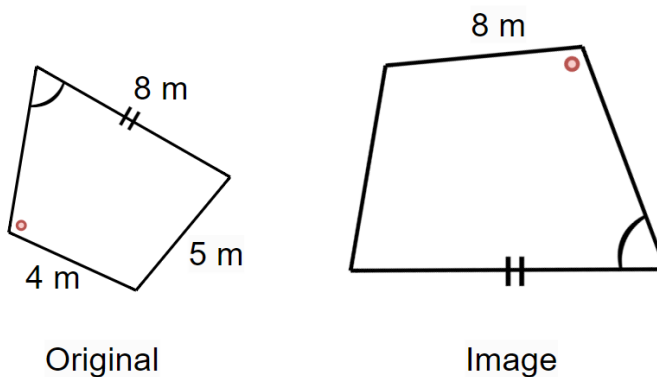
(8) Which type of quadrilateral has all sides equal, two pairs of opposite parallel sides, no right angles, and a perpendicular diagonal?

- A. Trapezium
- B. Rhombus
- C. Kite
- D. Parallelogram

**Answer: B. Rhombus**



(9) What is the scale factor that enlarges the original figure to the image?

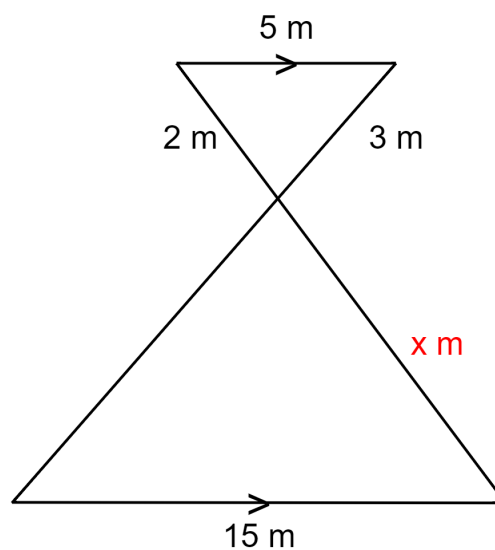


- A. 1      B. 2      C. 1.5      D. 3      E.  $\frac{2}{3}$

Answer: B. 2

(10) Find the value of  $x$  in m.

- A.  $x = 6$   
B.  $x = 9$   
C.  $x = 10$   
D.  $x = 15$   
E.  $x = 23$



Answer: A.  $x = 6$

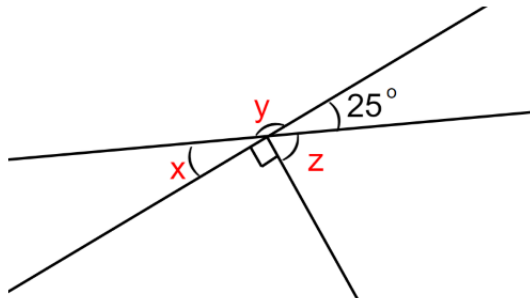


Question 2: Answer the following.

1

Find the missing angle in the diagrams. Give reasons for your answers.

a.

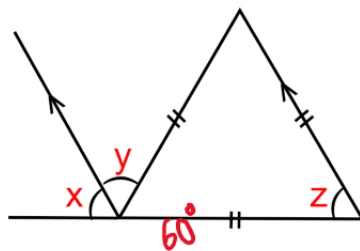


$$z = 90^\circ - 25^\circ = 65^\circ \text{ (Comp)}$$

$$y = 180^\circ - 25^\circ = 155^\circ \text{ (Sup.)}$$

$$x = 25^\circ \text{ (opposite)}$$

b.

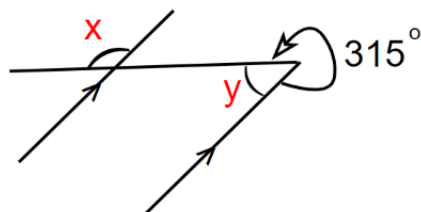


$$z = 60^\circ \text{ (equilateral triangle)}$$

$$y = z = 60^\circ \text{ (corresponding angles)}$$

$$x = 180^\circ - 60^\circ - 60^\circ = 60^\circ \text{ (sup.)}$$

c.



$$y = 360 - 315 = 45 \text{ (reflex angle)}$$

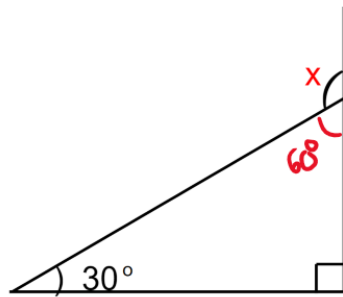
$$x = 180 - 45 = 135 \text{ (exterior angles)}$$



2

Name the following triangles and find the value of the pronumeral.

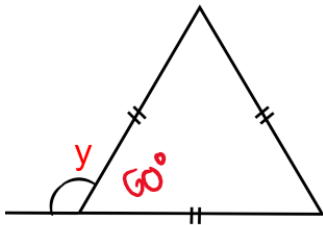
a.



Right - Angled Triangle

$$x = 180 - 60 = 120$$

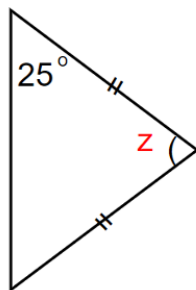
b.



Equilateral Triangle

$$y = 180 - 60 = 120$$

c.

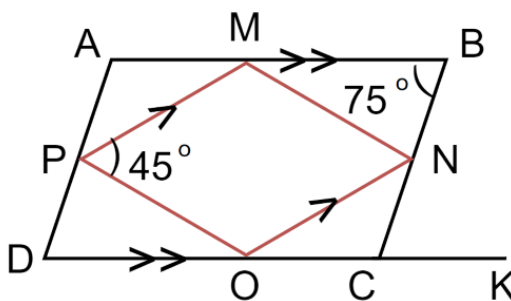


Isosceles Triangle

$$z = 180 - (2 \times 25) = 130$$



3



a. Find  $\angle BCD$

$$\angle BCD = 180 - 75 = 105^\circ \text{ (Interior angles)}$$

b. Find  $\angle ADO$

$$\angle ADO = \angle ABC = 75^\circ$$

c. Find  $\angle PMN$

$$\angle PMN = 180^\circ - 45^\circ = 135^\circ \text{ (Interior angles)}$$

d. Find  $\angle NCK$

$$\angle NCO = \angle BCD = 105^\circ$$

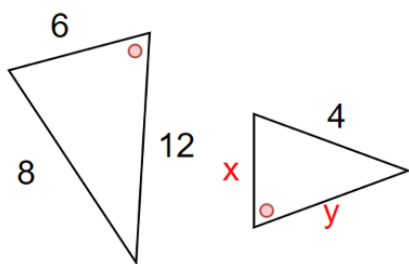
$$\angle NCK = 180 - 105^\circ = 75^\circ \text{ (Supplementary)}$$





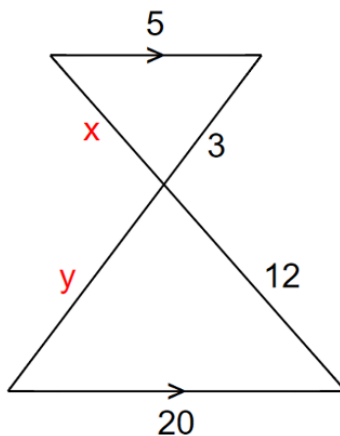
4

a.



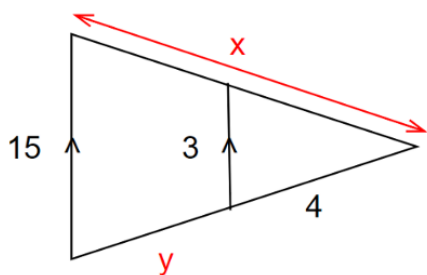
$$\begin{aligned}8 : 4 &\rightarrow 2 \\6 : x &\rightarrow x = 3 \\12 : y &\rightarrow y = 6\end{aligned}$$

b.



$$\begin{aligned}20 : 5 &\rightarrow 4 \\y : 3 &\rightarrow y = 12 \\12 : x &\rightarrow x = 3\end{aligned}$$

c.

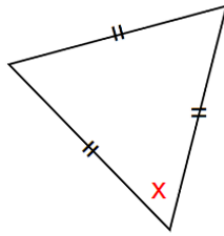
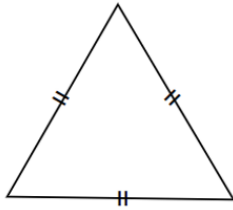


$$\begin{aligned}15 : 3 &\rightarrow 5 \\x : 4 &\rightarrow x = 20 \\y &= 20 - 4 = 16\end{aligned}$$



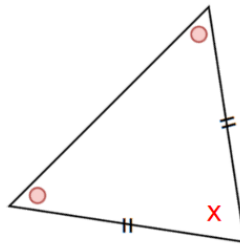
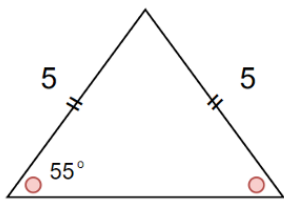
5

a.



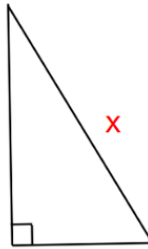
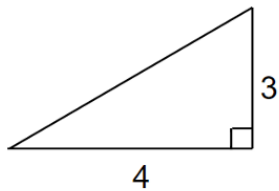
SSS  
 $x = 60^\circ$  (equilateral triangle)

b.



SAS or AAS  
 $x = 180 - (2 \times 55)$   
 $= 70^\circ$

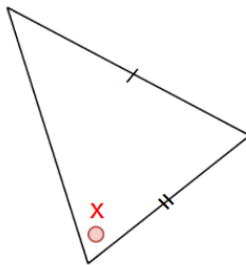
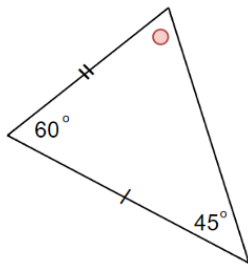
c.



RHS

$$x = \sqrt{3^2 + 4^2} = 5$$

d.

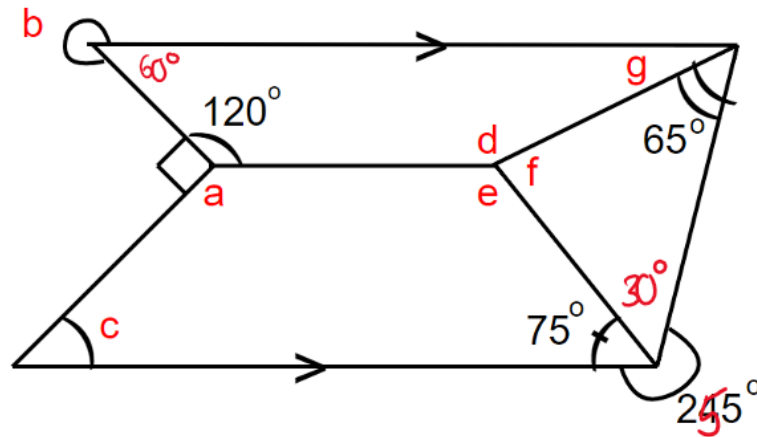


SAS

$$x = 180^\circ - 60^\circ - 45^\circ$$
$$= 75^\circ$$



6



$$a = 360 - 120 - 90 = 150^\circ$$

$$b = 360 - 60 = 300^\circ$$

$$c = 180 - 150 = 30^\circ$$

$$d = 360 - e - f = 170^\circ$$

$$e = 360 - a - c - 75 = 105^\circ$$

$$f = 180 - 65 - 50 = 85^\circ$$

$$g = 180 - d = 10^\circ$$